Huicheng Zheng

Date of Birth: March 30th, 1974

Place of Birth: Jiangxi, China

Professional Address: Thésard Informatique, ENIC-Telecom Lille1, Rue G. Marconi, Cité Scientifique, 59655 Villeneuve d'Ascq, France

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Professional Experience:

Jul. 1999 – Nov. 2001:

Worked in China Telecom as an assistant engineer. Maintained IAV(Interactive Audio and Video) system, remote education system, ADSL(Asymmetrical Digital Subscriber Line), broadband metropolitan area network and ATM network etc. Participated in the designing of the Guangzhou broadband networks (a key part of ChinaNet, the largest computer network in China). Organized and participated in a lot of projects about multimedia computer networks.

Education:

Dec. 2001-the present:

Ph.D student

Major: Computer Science

Supervisor: Dr. Mohamed Daoudi and Dr. Bruno Jedynak

School: ENIC-Telecom Lille 1, Villeneuve D'Ascq, France.

Subject of thesis: Image Filtering

Summary: I participated in the POESIA (Public Open-source Environment for a Safer Internet Access) project. It aims at developing an open-source (i.e. free) Internet content filtering software (notably to protect European youth against illegal or harmful content) through several advanced techniques (natural language analysis, image analysis, script analysis, decision making systems...). It is partly funded by the European Commission through the Safer Internet Action Plan.

To filter the pornographic images, we need first to detect skin. We considered a sequence of models for the skin detection, which will be used in the image filtering of POESIA. Each model is a maximum entropy model with respect to constraints concerning marginal distributions. These models are nested. The first model, called the baseline model is well known from practitioners. Pixels are considered as

independent. Performance, measured by the ROC curve on the Compaq Database is impressive for such a simple model. However, single image examination reveals very irregular results. The second model is a Hidden Markov Model which includes constraints that force smoothness of the solution. The ROC curve obtained shows better performance than the baseline model. Finally, color gradient is taken into account. Thanks to Bethe tree approximation, we obtain a simple analytical expression for the coefficients of the associated maximum entropy model. Since the Bethe tree is loop-free, we can apply the Belief Propagation to accelerate the algorithm. Performance, compared with the previous model is once more improved.

We represent the original input color image with the "skinness" image, each site of which is the belief of current pixel being skin. Then we calculate a sequence of features based on this "skinness" image. We build a neural network with these features on a very large training image database containing 5,084 photos. The experimental results based on thousands of test images show very good performance.

Papers:

1. H. Zheng, M. Daoudi and B. Jedynak, *"Adult Image Detection Using Statistical Model and Neural Network"*, submitted to Electronic Letters on Computer Vision and Image Analysis.
2. H. Zheng, H. Liu and M. Daoudi, *"Blocking Objectionable Images: Adult Images and Harmful Symbols"*, submitted to the 2004 IEEE International Conference on Multimedia and Expo(ICME'2004), Taipei, Taiwan, June 27th – 30th, 2004.
3. H. Zheng, M. Daoudi and B. Jedynak, "Adult Image Detection Using Statistical Model and Neural Network", submitted to 17th International Conference on Pattern Recognition(ICPR'2004), Cambridge, United Kingdom, August 23rd-26th, 2004.
4. H. Zheng, M. Daoudi and B. Jedynak, "Adult Image Detection Using Statistical Model", submitted to Compression et Représentation des Signaux Audiovisuels(CORESA'2004), Lille, France, May 25th-26th, 2004.
5. B. Jedynak, H. Zheng, M. Daoudi and D. Barret. "*Maximum Entropy Models for Skin Detection*". published in the Indian Conference on Computer Vision, Graphics and Image Processing December 2002.
6. B. Jedynak, H. Zheng, M. Daoudi and D. Barret. "*Maximum Entropy Models for Skin Detection*". published as technical report: PUB.IRMA, Lille 2002, Vol.57, Number XIII.
7. B. Jedynak, H. Zheng, M. Daoudi. *"Statistical model for skin detection"*. IEEE Workshop on Statistical Analysis in Computer Vision, in conjunction with CVPR 2003 Madison, Wisconsin, June 16th-22nd, 2003.
8. B. Jedynak, H. Zheng, M. Daoudi. *"Maximum entropy models for skin detection"*. International Workshop Energy Minimization Methods in Computer Vision and Pattern Recognition, EMMCVPR2003 Lisbon, Portugal, July 7th-9th, 2003.

Sept. 1996- Jun. 1999

Master of Science in Engineering

Major: Image Transmission and Processing

Supervisor: Zimei Xiao

Department: Electronics, Graduate School of Zhongshan University

Research Area: Image Compression, Image Processing, Pattern Recognition, JPEG, MPEG, H.261, H.263(+), Arithmetic Coding, Wavelet Transform and Fingerprint Recognition etc.

Main Research Projects Participated:

1. *New Methods to Compress High Resolution Image*, Nature and Science Fund of Guangdong Province
2. *Research on the Key Technology and Application of Digital Audio and Video*, Nature and Science Fund of Guangdong Province
3. *Research on Identity Recognition Technology of Human Body's Biological Characteristics*, Open Fund of Image Information Processing and Intelligent Control from Education Committee Open Labs

Papers Published:

1. J. Hong, Z. Xiao and H. Zheng, "*Fast Algorithm of Mallat's Wavelet Transform*", the Sixth National Multimedia Conference, elected as *the Excellent Paper*, China.
2. J. Hong, Z. Xiao and H. Zheng, "*Comparison of Wavelet Base in Image Compression*", the Sixth National Multimedia Conference, China.
3. J. Hong, Z. Xiao and H. Zheng, "*Realization of Wavelet Transform and Compression Program Base*", the Sixth National Multimedia Conference, China.
4. H. Zheng and Z. Xiao, "*DirectDraw and its Use in Image Displaying*", the Seventh National Multimedia Conference, China.

Marks: Among the first 3 in my class, each year. (totally 17 classmates in my class)

Honors/Awards: East Asia Antai Prize (1996~1997 academic year)

Dissertation: Application of Wavelet Transform in Video Coding

Marks: Excellent

Sept. 1992- Jun. 1996

Bachelor of Science
Major: Electronics and Information System
University: Zhongshan University
Dissertation: Arithmetic Coding of Image
Marks: Excellent

Honors/Awards:
1992~1993: Scholarship of Zhongshan University

1993~1994: Scholarship of National City Bank of New York
Scholarship of Zhongshan University
1994~1995: Scholarship of PHILIPS
Scholarship of Zhongshan University

Marks: Among the first 5 in my class each year. (totally 48 classmates in my class)

Excused from the examination for entering the Graduate School of Zhongshan University.

Sept. 1989- Jun. 1992

Senior high school student
School: Bailuzhou High School, Ji'An, Jiangxi, China

Honors/Awards:
1990: Second Class Medal in the National High School Math Contest
(Students of different grades attend the same contest. I am the no.1 among the same grade in my province.)
1991: First Class Medal in the National High School Math Contest
1991: Second Class Medal in the 8th National High School Physics Contest in Jiangxi Province
Elected the "Three Goods" Student for several times.

Marks: Among the first 5 in my grade each year (there are totally 300~360 classmates in my grade). Won the first place for several times.

Excused from the examination for entering Zhongshan University.

Languages:

Can read, speak and write English freely, including professional articles. Passed CET-6 (College English Test - Band 6) with excellent grade. Only 2~3 classmates in my class can achieve this.

Can read and speak some French.

Chinese is my native language. I can speak Mandarin Chinese and Cantonese freely.

Computer:

Can work with DOS, Microsoft Windows, UNIX, LINUX and the softwares therein, for example, Microsoft Office, Borland C(++), Visual C(++), Latex, Octave etc. Developed plenty of programs with C(++), BASIC and Fortran.

Network:

Studied LAN, MAN, WAN, Ethernet, Token Ring, FDDI, ATM etc. Maintained LAN, MAN and ATM etc.

Activities and Interests:

Light music

Science fiction film

Travelling

Sports: table tennis, badminton, jogging

References:

Mohamed Daoudi, associate professor of computer science, ENIC-Telecom Lille 1, thesis advisor. Email: daoudi@enic.fr

Bruno Jedynak, professor of applied mathematics in the Université Scientifique et Technique de Lille. He is currently a visiting professor at the Mathematical Sciences Department in the Johns Hopkins University. Email: bruno.jedynak@jhu.edu